

**Effects of Royal Jelly and Juvenile Hormone on Growth and Immunity in
Gromphadorhina portentosa and *Drosophila melanogaster***

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Growth hormones play a key role not only in control of development but also in regulation of immune function; investment in reproduction and somatic growth may also come at the cost of resources allocated to immune function. Previous research has focused primarily on endocrine modulation of immune function in vertebrates. Here, I will describe hormonal influences on investment patterns in immunity, growth and reproduction in several species of insects. Royal jelly (RJ), a modulator of reproduction and growth in honeybees, has been shown to induce similar effects in fruit flies (*Drosophila melanogaster*). Specifically, flies reared with royal jelly experienced hastened turnover time from youth to functioning adult and increased ovary size. Similar effects of RJ exposure have been observed in Madagascar hissing cockroaches (*Gromphadorhina portentosa*). In contrast, juvenile growth hormone (JH) maintains adolescent morphology and physiology in juvenile and increases reproductive output (via vitellogenesis) in adults across a wide variety of invertebrate taxa. However, studies in our lab have shown inconsistencies in the effects of JH exposure on hissing cockroaches and fruit flies in terms of both mortality and reproduction. In addition, JH given in combination with RJ produced distinctly different effects on both sex traits and reproductive patterns across species. In addition, we explored the specific impacts of RJ, JH and RJ+JH on immune functions, as measured by lytic and coagulatory activity, in invertebrates. We will discuss the implications of our findings for both our understanding of hormonal control in invertebrates and consequences of variable energy strategies across systems and taxa.